

This Listing of Claims will replace all prior versions, and listings, of claims in this application:

Listing of Claims:

1. (Currently amended) An isolated polynucleotide molecule comprising:
 - (a) a first nucleic acid molecule at least 90% identical to SEQ ID NO: 1,
wherein said first nucleic acid molecule encodes ~~encoding~~ an aspartate kinase (ask)
polypeptide at least 80% identical to SEQ ID NO: 2, wherein said ask polypeptide has
aspartate kinase activity in *Corynebacterium*;
 - (b) a second nucleic acid molecule at least 90% identical to SEQ ID NO: 3,
wherein said second nucleic acid molecule encodes ~~encoding~~ an aspartate-semialdehyde
dehydrogenase (asd) polypeptide at least 80% identical to SEQ ID NO: 4, wherein said
asd polypeptide has aspartate-semialdehyde dehydrogenase activity in *Corynebacterium*;
 - (c) a third nucleic acid molecule at least 90% identical to SEQ ID NO: 5,
wherein said third nucleic acid molecule encodes ~~encoding~~ a dihydrodipicolinate
reductase polypeptide at least 80% identical to SEQ ID NO: 6, wherein said
dihydrodipicolinate reductase polypeptide has dihydrodipicolinate reductase activity in
Corynebacterium; and
 - (d) a fourth nucleic acid molecule at least 90% identical to SEQ ID NO: 7,
wherein said fourth nucleic acid molecule encodes ~~encoding~~ a diaminopimelate
dehydrogenase (ddh) polypeptide at least 80% identical to SEQ ID NO: 8, wherein said
ddh polypeptide has diaminopimelate dehydrogenase (ddh) activity in *Corynebacterium*.

2. (Currently amended) The polynucleotide molecule of claim 1, wherein said ~~polynucleotide molecule comprises a nucleic acid encoding a complete or truncated~~ diaminopimelate dehydrogenase (ddh) polypeptide is a truncated ddh polypeptide, wherein said truncated ddh polypeptide has at least 80% identity to SEQ ID NO: 8 and has diaminopimelate dehydrogenase activity.

3. (Currently amended) The polynucleotide molecule of claim 2, wherein said polynucleotide molecule additionally comprises a fifth nucleic acid molecule encoding:

(a) a complete or truncated ORF2 polypeptide, wherein said fifth nucleic acid molecule is complete ORF2 polypeptide of SEQ ID NO: 9 is encoded by a nucleotide sequence at least 90% identical to SEQ ID NO: 9; and encodes an ORF2 polypeptide with an amino acid sequence at least 80% identical to SEQ ID NO: 10, wherein said ORF2 polypeptide increases lysine synthesis in *Corynebacterium*; or

(b) wherein said a truncated ORF2 polypeptide, wherein said fifth nucleic acid molecule is at least 25% identical to SEQ ID NO: 9, and wherein said truncated ORF2 polypeptide has an amino acid sequence at least 25% identical to SEQ ID NO: 10 and has a length, measured in total number of amino acids, of at least 25% of the full length of an ORF2 a polypeptide consisting of SEQ ID NO: 10, and wherein said ORF2 polypeptide increases lysine synthesis in *Corynebacterium*.

4. (Currently amended) The polynucleotide molecule of Claim 1

(a) wherein said polynucleotide molecule further comprises a sixth nucleic acid molecule, wherein said sixth nucleic acid molecule is at least 90% identical to SEQ ID NO: 11, and wherein said sixth nucleic acid molecule encodes ~~encoding: (a) a complete a non-truncated or~~ truncated diaminopimelate decarboxylase (lysA) polypeptide of at least 80% identical to SEQ ID

NO:12 ~~and has having~~ diaminopimelate decarboxylase activity in *Corynebacterium*; and optionally

(b) ~~a diaminopimelate dehydrogenase (ddh) polypeptide of SEQ ID NO: 8 wherein said ddh polypeptide is complete or truncated, wherein said truncated polypeptide has at least 80% sequence identity to SEQ ID NO:8 and has ddh activity;~~ and optionally

(c) wherein said polynucleotide molecule comprises a fifth nucleotide molecule, (i) wherein said fifth polynucleotide molecule is at least 90% identical to SEQ ID NO: 9, and wherein said fifth polynucleotide molecule encodes an ORF2 polypeptide with an amino acid sequence at least 80% identical to SEQ ID NO: 10, wherein said ORF2 polypeptide increases lysine synthesis in *Corynebacterium* of SEQ ID NO:10, or (ii) wherein said ORF2 polypeptide is complete or truncated, wherein said truncated ORF2 polypeptide has a length measured in total number of amino acids, of at least 25% of the full length of an ORF2 polypeptide of SEQ ID NO:10, and is encoded by a polynucleotide having at least 90% sequence identity to SEQ ID NO:9, and wherein said truncated ORF2 polypeptide increases lysine synthesis in *Corynebacterium*.

5. (Previously presented) The polynucleotide molecule of claim 4, wherein said polynucleotide molecule additionally comprises a P1 promoter element of SEQ ID NO: 15.

6. (Previously presented) The polynucleotide molecule of claim 5, wherein said P1 promoter element is adjacent to said nucleic acid encoding diaminopimelate decarboxylase.

7. (Previously presented) The polynucleotide molecule of claim 1, wherein said ask, asd and dihydrodipicolinate reductase polypeptides are encoded by genes from a cell of the genus *Corynebacterium*.

8. (Previously presented) The polynucleotide molecule of claim 1, wherein said ask and asd polypeptides are encoded by an ask/asd operon comprising a nucleotide sequence encoding two polypeptides one having ask activity and the other having asd activity, wherein said ask polypeptide is least 80% identical to SEQ ID NO:2 and said asd polypeptide is at least 80% identical to SEQ ID NO: 4 and wherein said nucleotide sequence encoding said ask polypeptide is at least 90% identical to SEQ ID NO: 1 and said nucleotide sequence encoding said asd polypeptide is at least 90% identical to SEQ ID NO: 3.

9. (Previously presented) The polynucleotide molecule of claim 2, wherein said ddh polypeptide is encoded by a gene from a cell of the genus *Corynebacterium*.

10. (Previously presented) The polynucleotide molecule of claim 3, wherein said complete or truncated ORF2 polypeptide is encoded by a gene from a cell of the genus *Corynebacterium*.

11. (Previously presented) The polynucleotide molecule of claim 4, wherein said diaminopimelate decarboxylase polypeptide is encoded by a gene from a cell of the genus *Corynebacterium*.

12. (Previously presented) The polynucleotide molecule of claim 1, wherein said dihydrodipicolinate reductase polypeptide is encoded by a nucleotide sequence at least 90% identical to SEQ ID NO: 5.

13. (Previously presented) The polynucleotide molecule of claim 2, wherein said ddh polypeptide is encoded by a nucleotide sequence at least 90% identical to SEQ ID NO: 7.

14. (Cancelled).

15. (Previously presented) The polynucleotide molecule of claim 4, wherein said diaminopimelate decarboxylase polypeptide is encoded by a nucleotide sequence at least 90% identical to SEQ ID NO: 11.
16. (Original) A vector comprising the isolated polynucleotide molecule of claim 1.
17. (Previously presented) A host cell comprising the vector of claim 16.
18. (Previously presented) The host cell of claim 17, wherein said host cell is a prokaryotic cell.
19. (Previously presented) The host cell of claim 17, wherein said host cell is a eukaryotic cell.
20. (Previously presented) The host cell of claim 17, wherein said host cell is a cell of the genus *Corynebacterium*.
21. (Original) The host cell of claim 17, wherein said host cell is an *Escherichia coli* cell.
22. (Original) A method for transforming a host cell comprising:
 - (a) transforming a host cell with the polynucleotide molecule of claim 1, wherein said isolated polynucleotide molecule is stably integrated into said host cell's chromosome; and
 - (b) selecting a transformed host cell.
23. (Original) A method for transforming a host cell comprising:
 - (a) transforming a host cell with the polynucleotide molecule of claim 1, wherein said isolated polynucleotide molecule is maintained in said host cell as extrachromosomal DNA; and
 - (b) selecting a transformed host cell.

24. (Withdrawn) A method of producing lysine comprising culturing said host cells of claim 17 in a culture medium, wherein said host cells produce lysine into said culture medium.

25. (Cancelled)

26. (Previously presented) The polynucleotide molecule of claim 7, wherein said cell is *Corynebacterium glutamicum*.

27. (Previously presented) The polynucleotide molecule of claim 9, wherein said cell is *Corynebacterium glutamicum*.

28. (Previously presented) The polynucleotide molecule of claim 10, wherein said cell is *Corynebacterium glutamicum*.

29. (Previously presented) The polynucleotide molecule of claim 11, wherein said cell is *Corynebacterium glutamicum*.

30. (Previously presented) The polynucleotide molecule of claims 7, 9, 10, or 11 wherein said cell is selected from the group consisting of cells deposited as NRRL-B30236 and NRRL-B30237.

31. (Previously presented) The host cell of claim 17 wherein said host cell is of the genus *Brevibacterium*.

32. (Previously presented) The host cell of claim 31 wherein said host cell is *Brevibacterium flavum*.

33. (Previously presented) The host cell of claim 31 wherein said host cell is *Brevibacterium lactofermentum*.

34. (Previously presented) The host cell of claim 31 wherein said host cell is of the genus *Brevibacterium* selected from the group consisting of the cells deposited as NRRL-

B30218, NRRL-B30219, NRRL-B30220, NRRL-B30221, NRRL-B30222, NRRL-B30234, NRRL-B30235, NRRL-B30410, NRRL-B30458, NRRL-B30459 and NRRL-B30522.

35. (Previously presented) The host cell of claim 20 wherein said host cell is selected from the group consisting of the cells deposited as NRRL-B30236, NRRL-B30237, NRRL-B30458, and NRRL-B30522.

36. (Previously presented) The host cell of claim 21 wherein said *E. coli* cell is deposited as NRRL-B30228.

37. (Currently amended) The A vector comprising the isolated polynucleotide of Claim 1 and a vector selected from the group consisting of pBR322, CoE1, PSC101, pACYC184, pi-VX, pET, pQE70, pQE60, pQE-9, pBs, phagescript, pziX174, pBlueScript SK, pBsKS, pNH8a, pNH16a, pNH18a, pNH46a, pTrc99A, pKK223-3, and pKK233-3.

38. (Previously presented) The vector of claim 16 further comprising one or more control regions operably linked to said vector, said control region selected from one or more of the group of control regions consisting of inducer binding sites, repressor binding sites, and enhancers.

39. (Previously presented) The vector of Claim 16, wherein said vector is selected from the group consisting of pDElia2_{FC5}-KDB, pK184-KDBH, pDElia2_{FC5}-KDB2, and pDElia2_{FC5}-KDB2HL.

40. (Withdrawn) Lysine produced by a host cell of claim 17.

41. (Withdrawn) A polynucleotide encoding an ORF2 polypeptide having thymidilate synthase or 2,3-dihydrodipicolinate N-C6-lyase activity, wherein said polynucleotide has at least 90% sequence identity to SEQ ID NO: 9.

42. (Withdrawn) An ORF2 polypeptide having thymidilate synthase or 2,3-dihydrodipicolinate N-C6-lyase activity and an amino acid sequence length of at least 25% of the amino acid sequence length of SEQ ID NO: 10.

43. (New) The polynucleotide molecule of claim 1, wherein said diaminopimelate dehydrogenase (ddh) polypeptide is a non-truncated ddh polypeptide.

44. (New) An isolated polynucleotide molecule comprising:

- (a) a first nucleic acid molecule with SEQ ID NO: 1;
- (b) a second nucleic acid molecule with SEQ ID NO: 3;
- (c) a third nucleic acid molecule with SEQ ID NO: 5; and
- (d) a fourth nucleic acid molecule with SEQ ID NO: 7.